REMARKS

This communication is in response to the non-final Office Action ("Office Action") mailed on March 3, 2008 in which claims 1-16 and 30 were pending. In the Office Action, claims 1-11, 13-16 and 30 were rejected and claim 12 was indicated to be allowable if rewritten into independent form. With this response, claims 1 and 7 are amended, and new claims 31-34 are added. Applicants respectfully request reconsideration and allowance of pending claims 1-16 and 30-34, in light of the amendments and in view of the arguments presented below.

1. Allowable Subject Matter

Applicants respectfully thank the Examiner for the indication of allowable subject matter with respect to claim 12, at page 12, paragraph 9 of the Office Action. Specifically, the Office Action indicates that claim 12 would be allowable if rewritten into independent form including all of the limitations of the base claim and any intervening claims. With this response, new claims 31-34 are added. Since claims 16-29 were previously canceled, which claims included at least one independent claim, Applicants believe that no additional claim fees are required for new claims 31-34. New claim 31 represents claim 12 rewritten into independent form. Claims 32-34 depend from new claim 31, and are allowable at least by virtue of their dependency from allowable claim 31. Accordingly, claims 31-34 are allowable, and consideration and notice to that effect is respectfully requested.

2. Claims 1, 6, 7, 11, and 13 Are Allowable over Rouphael and Haunstein

Applicants respectfully traverse the rejection of claims 1, 6, 7, 11, and 13 under 35 U.S.C. §103(a) over U.S. Patent Publication No. 2003/0138040 ("Rouphael") in view of U.S. Patent Publication No. 2003/0142740 ("Haunstein"), at pages 2-6, paragraph 3 of the Office Action.

Turning to claim 7, the asserted combination of Rouphael and Haunstein fails to disclose or suggest "receiving a signal comprising a plurality of bit patterns at a bank of equalizers, each equalizer in the bank of equalizers tuned to a different bit pattern with a corresponding

equalization target during normal operation," as recited in claim 1. In contrast, Rouphael discloses "during normal operation only one branch, e.g. feedback equalizer 30, is operative." *See Rouphael*, p. 2, paragraph [0019]. Further, Rouphael discloses that one or more other equalizers are activated after an error threshold is exceeded, triggering two or more equalizers to operate in parallel. *See Rouphael*, p. 2, paragraph [0019]. Additionally, Rouphael discloses that once a decision is made, an equalizer is selected that remains operating and becomes the selected equalizer until the error threshold is again exceeded. *See Rouphael*, p. 3, paragraphs [0019] and [0026]. While Rouphael discloses that multiple split paths can be used with multiple parallel feedback equalizers that work with different sets of parameters, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Further, Rouphael discloses that, even when implemented in software, "the software solution needs to process data only for one equalizer, e.g., equalizer 130 until the error threshold, e.g., the number of consecutive ambiguous values or any other available threshold value is exceeded." *See Rouphael*, p. 4, paragraph [0035]. Rouphael fails to disclose or suggest "receiving a signal comprising a plurality of bit patterns at a bank of equalizers, each equalizer in the bank of equalizers tuned to a different bit pattern with a corresponding equalization target during normal operation," as recited in claim 1.

Haunstein fails to overcome the deficiencies of Rouphael. In particular, Haunstein discloses that "the sampling instant may be tuned" (*Haunstein*, p. 1, paragraph [0013]) and "tunable delay buffers" (*Haunstein*, p. 2, paragraph [0017]). Further, Haunstein discloses that the bit decision threshold is tunable. *See Haunstein*, p. 2, paragraph [0020] and p. 3, paragraph [0034]. Haunstein discloses that "data recovery circuitry 7" includes "a signal equalizer." *See Haunstein*, p. 2, paragraph [0030]. However, Haunstein fails to disclose or suggest "a bank of equalizers," as recited in claim 1. Further, Haunstein fails to disclose or suggest "receiving a signal comprising a plurality of bit patterns at a bank of equalizers, each equalizer in the bank of equalizers tuned to a different bit pattern with a corresponding equalization target during normal operation," as recited in claim 1.

Accordingly, the asserted combination of Rouphael and Haunstein does not disclose or suggest at least one element of claim 1, and of claims 2-6, at least by virtue of their dependency from allowable claim 1. Therefore, the rejection of claims 1 and 6 over Rouphael and Haustein should be withdrawn.

The asserted combination of Rouphael and Haunstein fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. As discussed above, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Haunstein fails to overcome the deficiencies of Rouphael. Instead, Haustein discloses only one equalizer and that the sampling instant or the bit decision threshold is tunable, not the equalizer pattern. *See Haunstein*, p. 1, paragraph [0013], and p. 2, paragraphs [0017] and [0030].

Thus, the asserted combination of Rouphael and Haunstein fails to disclose or suggest at least one element of claim 7, and of claims 11 and 13, at least by virtue of their dependency from allowable claim 7. Therefore, the rejection of claims 7, 11, and 13 over Rouphael and Haunstein should be withdrawn.

3. Claims 2-3 Are Allowable over Rouphael and Cideciyan

Applicants respectfully traverse the rejection of claims 2-3 under 35 U.S.C. §103(a) over Rouphael in view of U.S. Patent No. 6,460,150 ("Cideciyan") at pages 6-7, paragraph 4 of the Office Action.

Claims 2 and 3 depend from independent claim 1. The asserted combination of Rouphael and Cideciyan fails to disclose or suggest "receiving a signal comprising a plurality of bit patterns at a bank of equalizers, each equalizer in the bank of equalizers tuned to a different bit

pattern with a corresponding equalization target during normal operation," as recited in claim 1. As discussed above, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Cideciyan fails to overcome the deficiencies of Rouphael. In particular, Cideciyan discloses a digital equalizer that shapes the output of the A/D converter to partial-response signal samples, which are provided to a partial response maximum likelihood (PRML) detector. *See Cideciyan*, col. 3, line 58 to col. 4, line 2. Cideciyan fails to disclose or suggest "a bank of equalizers, each equalizer in the bank of equalizers tuned to a different bit pattern with a corresponding equalization target during normal operation," as recited in claim 1. Accordingly, the asserted combination of Rouphael and Cideciyan fails to disclose or suggest at least one element of claim 1, and of claims 2-3, at least by virtue of their dependency from allowable claim 1. Therefore, the rejection of claims 2-3 over Rouphael and Cideciyan should be withdrawn.

4. Claims 4-5, 9-10, and 14 Are Allowable over Rouphael and Moon, et al.

Applicants respectfully traverse the rejection of claims 4-5, 9-10, and 14 under 35 U.S.C. §103(a) over Rouphael in view of "Pattern-Dependent Noise Prediction in Signal-Dependent Noise," IEEE Journal on Selected Areas in Communications, vol. 19, no. 4, April 2001 ("Moon, et al.") at pages 7-9, paragraph 5 of the Office Action.

Claims 4-5 depend from allowable claim 1. The asserted combination of Rouphael and Moon, et al. fails to disclose or suggest receiving a signal comprising a plurality of bit patterns at a bank of equalizers, each equalizer in the bank of equalizers tuned to a different bit pattern with a corresponding equalization target during normal operation," as recited in claim 1. Moon, et al. fails to overcome the deficiencies of Rouphael. In particular, Moon, et al. is directed to a technique for pattern-dependent noise prediction. *See Moon, et al.*, p. 730, Abstract. In particular, Moon, et al. discloses that a linear prediction is used, which allows for immediate and intuitive derivation of the branch metric. *See Moon, et al.*, p. 730, col. 2, lines 5-6. In part II, Moon, et al. discloses that the detector assumes an equalized channel output vector that includes

a signal vector and a noise vector, both of which depend on the input bit sequence. *See Moon, et al.*, p. 731, col. 1, lines 1-7. However, Moon, et al. does not disclose or suggest "a bank of equalizers," as recited in claim 1. Instead, Moon, et al. discloses since the Viterbi-like algorithm is implemented on a finite trellis, which can be characterized by a finite segment of the specific bit sequence, which allows for the determination of "optimal predictors and their variances. *See Moon, et al.*, p. 731, lines 13-23. In Moon, et al., the decoder is modeled by the statistical formulas, but the specific implementation of the decoder is not described. Further, Moon, et al. does not disclose or suggest "each equalizer in the bank of equalizers tuned to a different bit pattern with a corresponding equalization target during normal operation," as recited in claim 1. Accordingly, the asserted combination of Rouphael and Moon, et al. fails to disclose or suggest at least one element of claim 1, and of claims 4-5, at least by virtue of their dependency from allowable claim 1.

Claims 9-10 and 14 depend from allowable claim 7. The asserted combination of Rouphael and Moon, et al. fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. As discussed above, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Moon, et al. fails to overcome the deficiencies of Rouphael. Moon, et al. fails to overcome the deficiencies of Rouphael. In particular, Moon, et al. is directed to a technique for pattern-dependent noise prediction. *See Moon, et al.*, p. 730, Abstract. In particular, Moon, et al. discloses that a linear prediction is used, which allows for immediate and intuitive derivation of the branch metric. *See Moon, et al.*, p. 730, col. 2, lines 5-6. In part II, Moon, et al. discloses that the detector assumes an equalized channel output vector that includes a signal vector and a noise vector, both of which depend on the input bit sequence. *See Moon, et al.*, p. 731, col. 1, lines 1-7. However, Moon, et al. does not disclose or suggest "a bank of equalizers," as recited in claim 1. Instead, Moon, et al. discloses since the Viterbi-like algorithm is implemented on a finite trellis, which can be

characterized by a finite segment of the specific bit sequence, which allows for the determination of "optimal predictors and their variances. *See Moon, et al.*, p. 731, lines 13-23. In Moon, et al., the decoder is modeled by the statistical formulas, but the specific implementation of the decoder is not described. While Moon, et al. discloses multiple noise predictor taps that can be trained, either using a model or using real data, Moon discloses that, at each cycle, only one predictor is selected based on the known bit pattern and its taps are adjusted in the direction of minimizing the corresponding bit error. *See Moon, et al.*, p. 740, col. 2, lines 5-8. Further, Moon, et al. does not disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited in claim 7. Accordingly, the asserted combination of Rouphael and Moon, et al. fails to disclose or suggest at least one element of claim 7, and of claims 9-10 and 14, at least by virtue of their dependency from allowable claim 7. Therefore, the rejection of claims 9-10 and 14 over Rouphael and Moon, et al. should be withdrawn.

5. Claim 8 is Allowable over Rouphael and Kwon

Applicants respectfully traverse the rejection of claim 8 under 35 U.S.C. §103(a) over Rouphael in view of U.S. Patent Publication No. 2004/0156459 ("Kwon") at pages 9-10, paragraph 6 of the Office Action.

Claim 8 depends from independent claim 7. The asserted combination of Rouphael and Kwon fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. As discussed above, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Kwon fails to overcome the deficiencies of Rouphael. Instead, Kwon discloses a single equalizer, illustrated in Figure 4, and described at page 2, paragraph [0038] to page 3, paragraph [0050]. In Kwon, the equalizer of Figure 4

calculates correlations between "field synch signal" and a "received signal" and "predicts a signal having more than a threshold value as multi-path by means of a pre-determined algorithm." *See Kwon*, p. 2, paragraph [0041]. Kwon is directed to filtering "pre-ghosts" and "post-ghosts" from the received signal, and the error values are used to repeatedly update the filters. *See Kwon*, p. 3, paragraph [0050]. With respect to FIG. 5, Kwon describes only a single equalizer. *See Kwon*, p. 3, paragraph [0051] to p. 4, paragraph [0066]. Kwon fails to disclose or suggest "a bank of equalizers," as recited in claim 7. Further, Kwon fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. Accordingly, the asserted combination of Rouphael and Kwon fails to disclose or suggest at least one element of claim 8, at least by virtue of its dependency from allowable claim 7.

Further, the Office acknowledges that Rouphael fails to disclose or suggest "dividing the segment of the received signal into finite overlapped segments and calculating an equalized output for each of the finite segments with the bank of equalizers," as recited in claim 8. *See Office Action*, p. 10, paragraph 6. The Office asserts that Kwon discloses this feature. *See Office Action*, p. 10, paragraph 6. While Kwon discloses that the equalizer can include an "overlapped feed forward filter" (*see Kwon*, p. 3, paragraph [0053]), that the feed forward filter can have "an overlap characteristic" (*see Kwon*, p. 3, paragraph [0061]), and that the feed forward unit has "an overlap characteristic that compensates for a pre-determined number of post-ghosts (*see Kwon*, p. 4, paragraph [0067]), Kwon does not disclose "dividing a segment of the received signal into finite overlapped segments," as recited in claim 8. Further, Kwon does not disclose "calculating an equalized output for each of the finite segments with the bank of equalizers," as recited in claim 8. In contrast, Kwon discloses only a single equalizer and a filtered output from a single equalizer. Accordingly, the asserted combination of Rouphael and Kwon fails to disclose or suggest at least one element of claim 8.

Thus, the asserted combination of Rouphael and Kwon does not disclose or suggest all of the elements of claim 8, or of claim 7 from which claim 8 depends. Accordingly, the rejection of claim 8 over Rouphael and Kwon should be withdrawn.

6. Claim 15 is Allowable over Rouphael and Ojard

Applicants respectfully traverse the rejection of claim 15 under 35 U.S.C. §103(a) over Rouphael in view of U.S. Patent Publication No. 2005/0031061 ("Ojard") at pages 10-11, paragraph 7 of the Office Action.

Claim 15 depends from allowable claim 7. The asserted combination of Rouphael and Ojard fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. As discussed above, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Ojard fails to overcome the deficiencies of Rouphael. Ojard discloses a single decision feedback equalizer. *See Ojard*, p. 5, paragraph [0060]; p. 10, paragraph [0115]; and p. 11, paragraph [0121]. In general, Ojard discloses that the feedback equalizer receives the output from a noise whitening filter and provides an input to a summing node. *See Ojard*, p. 11, paragraph [0121]. Ojard discloses that insertion of white noise can reduce noise power. *See Ojard*, p. 10, paragraph [0015]. However, Ojard fails to disclose or suggest "a bank of equalizers," as recited in claim 7. Further, Ojard fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. Accordingly, the asserted combination of Rouphael and Ojard does not disclose or suggest at least one element of claim 7, or of claim 15, at least by virtue of its dependency from allowable claim 7. Therefore, the rejection of claim 15 should be withdrawn.

7. Claim 16 is Allowable over Rouphael and Linnertz

Applicants respectfully traverse the rejection of claim 16 under 35 U.S.C. §103(a) over Rouphael in view of U.S. Patent Publication No. 2002/0181549 ("Linnertz") at page 11, paragraph 8 of the Office Action.

Claim 16 depends from allowable claim 7. The asserted combination of Rouphael and Linnertz fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. As discussed above, Rouphael discloses that only one equalizer is operable during normal operation, and that the other equalizers are triggered to operate during an evaluation (decision) process. *See Rouphael*, p. 2, paragraphs [0019], [0022], and [0023]. Linnertz fails to overcome the deficiencies of Rouphael. In particular, Linnertz discloses that "the receiver further comprising an equalizer for canceling intercarrier interference included in the received multicarrier signal in dependence on the estimated amplitudes and derivatives, wherein the channel estimator and/or the equalizer are arranged for exploiting an amplitude correlation between the amplitudes of different subcarriers and/or for exploiting a derivative correlation between the derivatives of different subcarriers." *See Linnertz*, p. 1, paragraph [0006]. Further, Linnertz discloses that the "equalizer 24 cancels intercarrier interference which may be included in the received multicarrier signal. The equalizer 24 outputs vectors of estimated symbols 25 (which have been derived from the vectors of received symbols) to a (soft) slicer 26." *See Linnertz*, p. 4, paragraph [0045]. Linnertz does not disclose or suggest "a bank of equalizers," as recited in claim 7. Further, Linnertz fails to disclose or suggest "processing a segment of a received signal in a bank of equalizers, each equalizer tuned to a different bit pattern and an equalization target to produce an equalized output for each equalizer during normal operation," as recited by claim 7. Accordingly, the asserted combination of Rouphael and Linnertz fails to disclose or suggest at least one element of claim 7, and of claim 16, at least by virtue of its dependency from allowable claim 7. Therefore, the rejection of claim 16 should be withdrawn.

CONCLUSION

Applicants have pointed out elements of the claims that are not disclosed or suggested by the cited references, alone or in combination. With this response, all of pending claims 1-16, 30, and 31-34 are in condition for allowance. Reconsideration and notice to that effect are respectfully requested.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application. The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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